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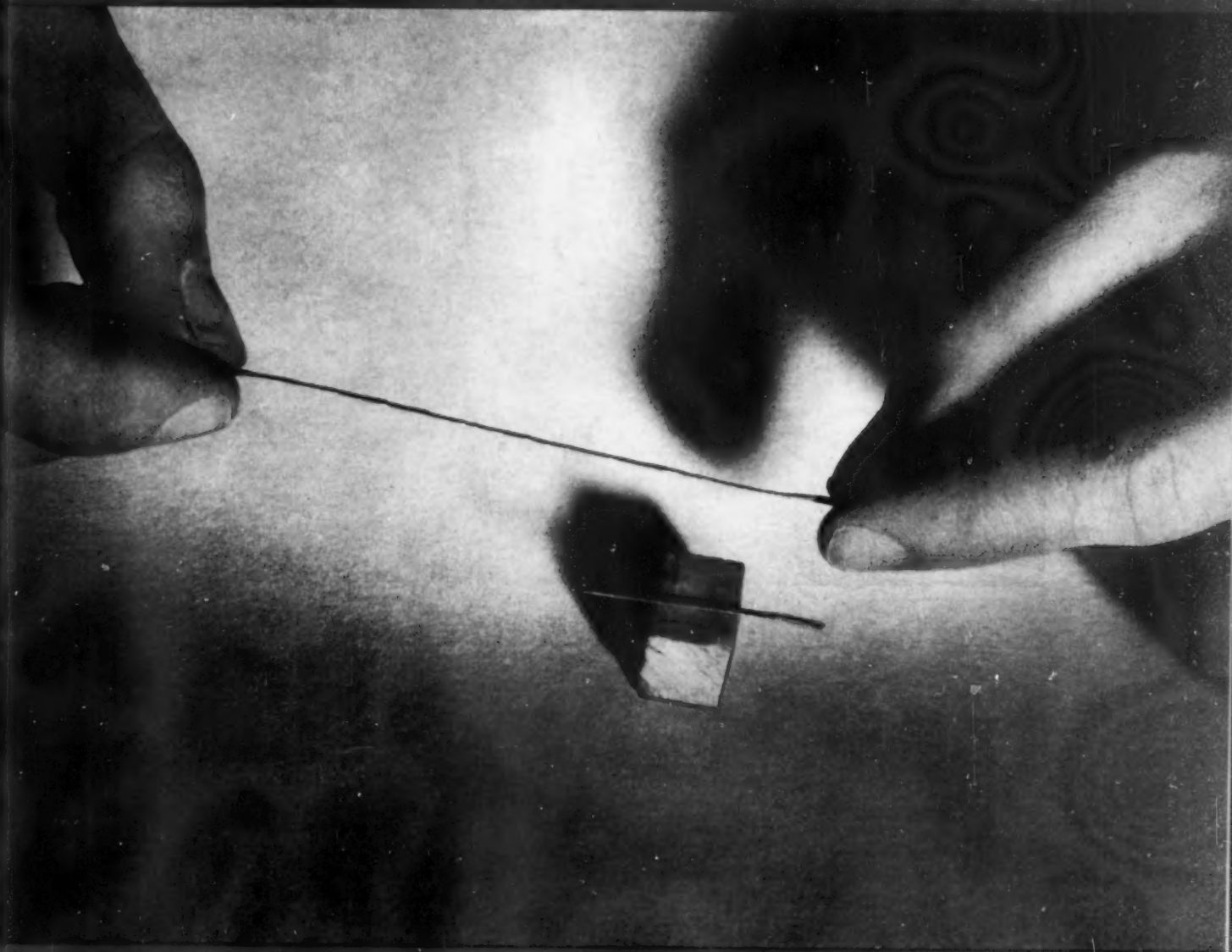
TECHNOLOGY DEPT.

DECEMBER 10, 1949

SCIENCE NEWS LETTER

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DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Trick Metals

See Page 378

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They Packed a Pole Line Into a Pipe

Back in the eighties, telephone executives faced a dilemma. The public demanded more telephone service. But too often, overloaded telephone poles just couldn't carry the extra wires needed, and in cities there was no room for extra poles. Could wires be packed away in cables underground?

Yes, but in those days wires in cables were only fair conductors of voice vibrations, good only for very short distances. Gradually cables were improved; soon

every city call could travel underground; by the early 1900's even cities far apart could be linked by cable.

Then Bell scientists went on to devise ways to get more service out of the wires. They evolved carrier systems which transmit 3, 12, or even 15 voices over a pair of long distance wires. A coaxial cable can carry 1800 conversations or six television pictures. This is another product of the centralized research that means still better service for you in the future.



BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

Cobalt Treats Cancer

Victims of cancer of the cervix have been treated with radioactive cobalt. Results are expected to indicate an improvement over the use of radium.

► THIRTY-FIVE cancer patients, chiefly women with cancer of the cervix (neck of the womb), have during the past year been treated with cobalt made radioactive in the Atomic Energy Commission's pile at Oak Ridge, Tenn.

The results should be slightly better than those that would be expected if radium had been used, although it is too soon and too few patients have been treated so far to be sure of this.

The treatments are being given under the direction of Dr. J. L. Morton at Ohio State University School of Medicine at Columbus. Development of the radiocobalt for this purpose was done by Dr. William Myers, physicist and physician, who is a special fellow at the same university.

Reasons for expecting slightly better results with radiocobalt than with radium are: 1. The cancer-destroying gamma rays from cobalt made radioactive in the pile are more energetic than those from radium in the form used in cancer treatment. The radium may deliver anywhere from 400,000 to slightly over 2,000,000 volts of energy but the cobalt will always deliver over a million volts from the same unit of material. This means physicians can give a more controlled and homogeneous dosage.

2. Radiocobalt can be put in places where radium cannot be placed. This means, in cases of cancer of the cervix for example, that the cancer-destroying radiation can be brought not only to the primary cancer in the neck of the womb but also to the broad ligaments which help hold it in place and to the walls of the pelvis. These are not reached with radium as ordinarily used, but they are regions where metastasis, or the spread of cancer, often occurs.

One of the chief advantages of radiocobalt over radium is that the beta rays from radiocobalt have only one-tenth the maximum energy of the beta rays from radium disintegration products. These beta rays from radium are strong enough to damage or kill healthy tissue around the radium needles. That is why radium needles used in cancer treatment are enclosed in a thick layer of gold or platinum. The gold or platinum in a single needle costs from \$10 to \$25, without counting the cost of the radium. The radiocobalt can be sheathed in less costly stainless steel or the relatively cheap metal, aluminum. These, or even a moderately thick tubing of nylon, are not only cheaper and handier but actually remove all the beta rays from the radiocobalt, whereas the platinum (in one-half millimeter thickness) does not remove all the

beta rays from the radium.

The radiocobalt can be recovered from the aluminum sheathing by dropping the whole thing into sodium hydroxide solution. This dissolves away the aluminum but does not dissolve the cobalt.

Because radiocobalt can be sheathed with materials like nylon and aluminum, and because it does not dissolve in body fluids such as blood, it can be used in ways radium cannot. The needles, for example, can be bent into different shapes and forms to fit the cancerous spot, or even can be wrapped right around the cancer. Doing this with radium needles would be dangerous because of the possibility of breakage. If a radium needle broke, radium salts escaping from it would be dissolved and carried by the blood to the bones, there to cause bone and life-destroying cancer. Needles of radon gas, if they broke, would

be equally dangerous. But the radiocobalt needles, if they should break though none has so far, do not carry this danger because the cobalt is not soluble.

The radiocobalt can be handled with an electromagnet, giving it another advantage over radium needles.

A "porcupine applicator" has been designed by Dr. Morton for using the radiocobalt in treatment of cancer of the cervix. This consists of several layers made of a plastic such as lucite or plexiglas with holes bored at various angles. The radiocobalt needles are fitted into these holes and the applicators applied in tiers, one over the other. The needles automatically go into the right locations when the applicator is inserted and there is no danger of creating "hot spots" where ulcers might form from crossing over of radiation from the different needles.

Recently Dr. Myers has been preparing the needles of pure cobalt. The first ones were made of an alloy of 45% cobalt and 55% nickel. Their size is such that laid side to side it would take about 25 of them to measure one inch, and their length is about one-third of an inch. These are sent to Oak Ridge, put in the pile, and come back each with radioactivity equivalent to one or one and one-half milligrams of radium.

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STREAMLINED "FLYING BANANA"—The Navy's new Piasecki HRP-2 is pictured during early flights at Morton, Pa. Its aluminum fuselage is the latest development in helicopters in the program to help America maintain leadership in transport type rotary wing aircraft. As many as 12 litter patients can be carried in the HRP-2. This type of aircraft is particularly suitable for mass rescues under the most adverse conditions and for troop-carrying assault tactics.

NUCLEAR PHYSICS

Atom "Breeding" Plant

► SEVEN years after man first achieved the self-sustained release of energy from the atom, construction will start on a plant to "breed" energy-releasing atoms from the non-exploding variety.

On Dec. 2, 1942, the first atomic pile, built under the University of Chicago's athletic field stands, was brought to the point where neutrons from the fissioning, or splitting, of uranium 235 became sufficient to sustain and repeat the action. That was the most essential step toward the atomic bomb.

On Dec. 1 this year, the Atomic Energy Commission had transferred to it Naval Proving Ground property near Arco, Idaho, to be used as the site for another basic experiment in atomic energy. This will be the testing of the possibility of transmuting non-fissionable uranium into fissionable plutonium in a process that produces more fissionable material than it consumes. If the experiment is completely successful, the amount of fissionable material available for peaceful as well as possible military purposes will be increased by 140 times. The actual increase may not be as great as that, but scientists are sure they will have more fissionable material from the "breeder reactor" process than they start with. And any increase will be advantageous. Figures on the expected increase start from the fact that only seven-tenths of one percent of natural uranium is in the form of the fissionable uranium 235. The transmutation process allows use of the more plentiful though non-fissionable uranium 238.

"Breeder" will not solve the raw material problem overnight, but the application of the breeder principle is considered the biggest forward step in peacetime application of atomic energy.

On pencil and paper, AEC authorities are sure that the engineering applications

as well as the purely nuclear-physical ones of the transmutation can be made. But the final answer will not come until some time in 1951 when the breeder reactor goes into operation. No trial runs with models can be made. Breeding must be done on a large scale if at all, because, as in the atom bomb, there is the problem of critical size.

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GEOLOGY

Pacific Coast Was Balmey 50 Million Years Ago

► MODERN man, if he were transported back through geological time about 50 million years, would find a strange climatic situation in the Pacific area.

As far north as Puget Sound he would be in the tropics. He could sit under a palm tree, and watch the surf pound against coral reefs.

He could bathe in warm waters, and catch tropical fish. He would have to keep on the alert, however, for crocodiles.

This is a partial picture of a section of the ancient world being pieced together by Dr. J. Wyatt Durham, associate professor of paleontology at the University of California. It is based upon Dr. Durham's studies of fossil specimens of marine animals in the Pacific Coastal region during the Eocene epoch, and upon research by others in allied fields.

The scientist said that since the Eocene epoch there has been a gradual shift of the tropical climate southward. This gradual shift was interrupted by rapid fluctuations both north and south during the Ice Age.

Dr. Durham has also refuted the widely held theory that the poles and continents shifted around during this past age. He

points out that the evidence indicates no major shifts of either the poles or continents in the past 50 million years.

For example, advocates of the theory of shifting poles would place the Kamchatka peninsula within 15 degrees of the North Pole at one time in this past age. However, the fossils of marine life of Kamchatka for that period are representative of a warm water environment. These animals could not have existed within 15 degrees of the North Pole, therefore the pole must have been in approximately its present position.

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What physical disorder has recently been found to be linked with neurotic personality? p. 380.

PHYSICS

Germanium Transmits Heat

Lenses of germanium which will transmit invisible heat rays have been developed. This promises spectacular improvement in infrared equipment.

► LENSES that will transmit invisible heat radiation, promising spectacularly improved infrared equipment for scientific and industrial use, can be made out of pure germanium and silicon metals as the result of researches made known to the American Physical Society at Chicago, Ill., by scientists from Purdue University.

Even though the metals are opaque to ordinary light and may be an inch thick, they transmit the infrared rays over a broad portion of their spectrum. Heretofore, rock salt and other materials softer than metal and attacked by moisture have been used for optical work with infrared radiation, which war applications showed was important for many uses.

The researches were done by a group of scientists headed by Dr. Karl Lark-Horovitz of the Purdue physics department and including K. W. Meissner, M. Becker and H. Y. Fan.

These researches are the outcome of electrical measurements on germanium alloys, which Dr. Lark-Horovitz and his colleagues in 1942 produced in such a way

that it was possible to make them semi-conducting either negatively or positively. Semiconductors with known and predictable properties were available then for the first time.

Investigation of the optical properties of these materials followed. Dr. Lark-Horovitz found that the material with high conductivity in the very far infrared has much higher reflectivity than the material of high resistance. It also has a smaller transmission of infrared radiation.

Pure germanium and silicon metals have been prepared which transmit 50% of the infrared "light" beyond 2 microns in wavelength. The loss that occurs is primarily due to the reflections and not to absorption.

Filters as well as lenses will be made of these stable materials. Grinding the metals to dimensions will be easier than with softer materials now used, and Dr. Lark-Horovitz predicts that the new development will result in a wider investigation and use of infrared phenomena in the future.

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ciety of Mechanical Engineers was told by P. L. Davidson, consulting engineer of Philadelphia. Both steps are required to maintain the air within at proper temperatures and humidity for good weaving, he indicated.

From a functional point of view, windows have only two excuses for existing, he stated. These are for light and ventilation or cooling. Daylight construction fails to give the light required as measured by today's standards, and the volume of air required for cooling can not be obtained through open windows.

Proper air-conditioning in a textile mill is a number one requirement to proper processing of fiber. Temperature and humidity must be controlled. The strength of cotton fiber, he said, is approximately 50% greater, the elasticity 20% greater, and the strength before rupture more than double at 75% relative humidity than at 40%. Beyond a relative humidity of 75% the strength falls off and the elasticity increases rapidly, so windows which interfere with temperatures by drafts and humidity by condensation should be eliminated.

Air cleanliness is another essential in a textile mill. Electrostatic filters were recommended by Mr. Davidson to replace present inadequate air washers and oil and cloth filters. In these newer filters, foreign matter in the air is given a static charge as it passes through them and is removed by electrical attraction to electrically charged plates.

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AERONAUTICS-ENGINEERING

Dual Turbo-Prop Engine

► TWO horsepower per pound of weight is developed by a new gas turbine engine for airplanes unveiled in Washington, D. C. It is of the type known as the turbo-prop, and is claimed to be the most powerful propeller-type engine ever cleared for flight.

The engine was developed for the U. S. Navy by the Allison Division of General Motors, Indianapolis. This company builds the widely used J35 turbo-jet engine which has acquired fame in speedy military fighter planes. The new engine is a different affair. The jet from its combustion chambers operates a turbine which in turn operates conventional propellers.

Turbo-props are already in use. Britain claims leadership in their development and application. The new engine is said to produce more power for its size and weight than any similar engine in the world.

Fuel economy is another feature of the new Allison turbo-prop. In this it exceeds that of recently revealed foreign engines. It matches the fuel economy of the best American reciprocating engines and produces twice as much power for each pound of weight. This XT40, as it is designated, rounds out the military requirement for an engine of the gas turbine

type which will transport payloads over long distances at high speeds and altitudes.

The XT40 is a completely new design which consists of two axial-flow gas turbine power sections driving a dual-rotation propeller through a common reduction gear. The power sections are connected together so that in effect they form a single unit. However, each power section may be operated independently.

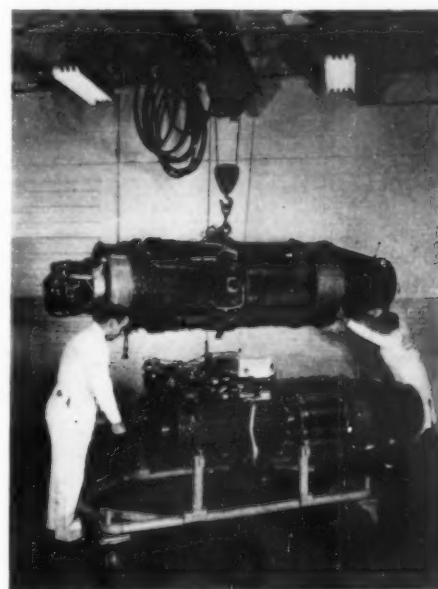
This feature permits takeoff at full power with both power sections operating. In flight at reduced power for cruising speeds, maximum fuel economy can be obtained by cutting out one power section. The engine operates on the same fuel as used in ordinary turbo-jets. Four of them are now being installed in a Convair XP5Y flying boat for early flight.

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ENGINEERING

Windowless Textile Mills Aid Air-Conditioning

► MODERN textile mills should be built without windows and the roof should be insulated from sun heat, the American So-



TURBO-PROP ENGINE — The small size of the new Allison XT40 turbo-prop engine is compared here (foreground) with the J35 turbo-jet engine. This engine will first be used in the Navy XP5Y Convair flying boat.

GENERAL SCIENCE

STS Exams Are Held

Young scientists compete in science aptitude examinations. Forty top students will receive invitations to the Science Talent Institute.

► **TEEN-AGE** scientists all over the United States sat down for some pre-Christmas writing on Dec. 5.

Their three-hour composition was no letter to Santa Claus but it will bring 40 of them the best Christmas present they ever had—an invitation to the five-day Science Talent Institute in Washington, D. C. and a chance to win a Westinghouse Science Scholarship.

Some 16,000 boys and girls will be taking a three-hour science aptitude examination in their own public, private and parochial schools as the first step in the competition for the \$11,000 in Westinghouse Science Scholarships offered in the Ninth Annual Science Talent Search, conducted by Science Clubs of America, administered by Science Service.

The high school seniors, all of whom aspire to careers in science, will also submit scholastic and other recommendations and a 1,000-word essay on the subject, "My Scientific Project" before the competition closes at midnight, Dec. 27.

The science aptitude examination, designed each year by Drs. Harold A. Edgerton and Stuart H. Britt, New York psychologists, is planned to reveal ability to think and reason rather than to measure acquired knowledge of science.

Only 40 boys and girls will be invited to the Ninth Annual Science Talent Institute in Washington, D. C., March 2 through 6, 1950. For five days they will learn about new developments in science, listen to and talk with prominent scientists and be introduced to possibilities for their future in scientific research.

During their five-day all-expense stay in Washington one of the young scientists

will receive the \$2,800 Westinghouse Grand Science Scholarship. Runners-up will receive scholarships ranging from \$100 to \$2,000. The \$11,000 in scholarships will be awarded at the discretion of the judges: Drs. Edgerton and Britt; Dr. Harlow Shapley, director, Harvard College Observatory; and Dr. Rex E. Buxton, Washington psychiatrist.

The judges will name 260 other entrants in the Science Talent Search for Honorable Mention and Science Clubs of America will assist them as well as the 40 winners in getting scholarships at the colleges, universities and technical schools of their choice. Previous Honorable Mentions have received valuable scholarships and other financial assistance in this way to continue their education.

A double chance to win scholarships or other financial assistance for furthering their education in science is offered to high school seniors in 17 areas. These boys and girls live in areas where State Science Talent Searches are in operation by special arrangement between Science Clubs of America and organizations of scientists and educators.

By entering the national competition, the Ninth Annual Science Talent Search, students will automatically be entered in their State Science Talent Search in the following areas: Alabama, District of Columbia, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Montana, New England (open to students in all six New England states), Pennsylvania, South Dakota, Tennessee, Texas, Virginia, West Virginia and Wisconsin. Write Science Clubs of America, 1719 N St., N. W., Washington, D. C. for details.

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ENGINEERING

Deep Oil Drilling Needs

► **DRILLING** for oil to four-mile depths will require a lot of changes in drilling techniques and equipment, the American Petroleum Institute was told in Chicago by John M. Payne, Shell Oil Company, Kilgore, Texas.

He presented the findings of a study group on deep drilling, the study being under the auspices of the Houston chapter of the institute's division of production.

Oil is now being produced from below 15,500 feet, he said, and it seems inevitable that the need for 20,000-foot commercial drilling will develop in the near future.

Deep drilling is an exact science for

which the equipment must be carefully engineered if it is to do a specific job.

Although one rig has successfully drilled to more than 20,000 feet in one locality, drilling in different localities, as well as completing a well at that depth, may offer a large number of problems which as yet have not been solved. The problems are technical, of course, and are concerned with matters ranging from the size of hole that must be drilled to equipment that can be used at the great depth.

Among the problems are those resulting from the high pressure and temperature encountered at 20,000-foot depths. This far

below the surface of the earth the temperature might be about 500 degrees Fahrenheit, Mr. Payne indicated. The temperature gradients, he stated, vary for different localities. However, abnormal temperatures amounting to 2.2 degrees Fahrenheit rise per 100 feet is considered the maximum which should be encountered.

One operator, he added, states that the maximum temperature to be expected in 20,000-foot wells will approximate 400 degrees Fahrenheit. If this is true, the present type of powders used in gun perforating probably can be used; however, speed of operation will be critical. One service company, he revealed, feels that 350 degrees Fahrenheit is the maximum temperature for safe operation.

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GENERAL SCIENCE

Shapley Elected Honorary Fellow by India Institute

► **DR. HARLOW SHAPLEY**, director of Harvard Observatory, has been elected an Honorary Fellow of the National Institute of Sciences of India.

Only four persons in the world besides Indians were so elected this year by the Institute, a non-governmental agency comparable to the National Academy of Sciences in the United States.

Three Honorary Fellows elected from other countries were Prince Louis de Broglie, French physicist, Hans van Euler, Swedish chemist and George Tishler, German botanist.

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Words in Science—EQUINOX-SOLSTICE

► **THE** equinox—you say it ee-kwi-noks, with the accent on ee—is the date on which the days and the nights are of equal length, and that occurs at the time the sun crosses the celestial equator.

One of these dates, usually about March 21, is called the vernal equinox. The other, about Sept. 22, is called the autumnal equinox. Because there is often a severe storm in September at about that date, the storm has been called the equinoctial.

The solstice is the point midway between the equinoxes. At the summer solstice, usually about June 21, the days are longest. At the winter solstice, about Dec. 21, the days are shortest.

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RADIO

Saturday, December 17, 3:15 p. m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Perrin H. Long, Professor of Preventive Medicine and Director of Department of Preventive Medicine of Johns Hopkins University, School of Medicine, Baltimore, Md., will talk about "New Treatments for Colds."

MICROSCOPY

Microscope Has X-Ray Eyes

A microscope which utilizes X-rays has been developed. It may possibly rival the electron microscope in the future.

➤ A MICROSCOPE has now been given X-ray eyes to enable scientists to see very small internal details of living and non-living materials.

Excellent results in first tests of the instrument were reported by Miss Charlys M. Lucht of the General Electric Research Laboratory, where it was made, at the meeting of the American Society for X-ray and Electron Diffraction in Philadelphia, Pa.

She predicted that the instrument may compete in the future with the electron microscope, which is the most powerful magnifying instrument now in use. Electron microscopes use a beam of electrons instead of light to form an image of materials under study.

With the X-ray microscope, X-rays are passed through the material being studied and then strike a pair of curved mirrors at an angle of less than one-half degree. The mirrors bend the X-ray beams in such a way as to cast a magnified X-ray image

of the sample on a photographic film.

The mirrors are platinum coated slabs of fused quartz which are as nearly flat surfaces as can be made. They are curved by mechanical pressure which can be adjusted by hand. This, Miss Lucht explained, makes it possible to change the curvature of the mirrors in order to improve focusing.

At present stage of development, magnifications of 100 diameters have been produced. X-ray images magnified 10 times are magnified another 10 times by photographic enlargement without serious loss of detail.

Objects studied so far have been fine mesh screens, selected for testing of the instrument's ability to show small details. Because the X-ray microscope, unlike the electron microscope, does not require samples under study to be in a high vacuum, it may make possible examinations of living materials at much higher magnifications than ever before.

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MEDICINE

Salmonella Baby Threat

➤ SALMONELLA Baby may be a runner-up to Typhoid Mary as an unsuspected disease carrier and spreader of epidemics.

A warning of this possibility comes from Drs. I. M. Mackerras and V. M. Pask of the Queensland Institute of Medical Research at Brisbane, Australia.

The diseases or epidemics Salmonella Babies might spread would be stomach and intestinal upsets and possibly the diarrheal diseases that cause havoc in hospital nurseries and similar institutions. Salmonella, pronounced sal-mon-ella, is the family name for a large group of organisms including those that cause paratyphoid fever and those that cause food poisoning, or ptomaine poisoning as it once was called.

During an epidemic in Australia, Dr. Mackerras found that babies under two years continued to harbor the Salmonella germs up to six months after they had recovered from their acute attack of severe stomach and intestinal sickness. Infections in older children and grown-ups were mild or unapparent and generally transitory.

Drs. Mackerras and Pask followed up this finding by examining specimens from a continuous series of babies admitted to maternal and child welfare clinics. The babies were mostly "feeding problems." Some had had "bowel upsets" but most

were normal and none was sick enough to be sent to a hospital.

Sixteen strains of salmonella were found in 14 babies of this series. If the clinic records approximate a random sample of the child population of Brisbane at the time (19,000 children under two years of age), there would have been more than 600 salmonella infections scattered through the baby population of the city. Yet only 33 cases of sickness from salmonella were treated in hospitals during the survey period.

This suggests that the germs are normally harmless but that under certain conditions they can become virulent and cause sickness.

This state of affairs is probably general and of considerable significance in connection with epidemics, the doctors point out, "because infection may be widespread in a community but completely unsuspected and therefore not attacked."

"There is in fact a permanent potential epidemic risk and it easy to understand," the doctors state, "how epidemics often arise when children are crowded together under conditions which favor spread from child to child."

"We feel," they state, "that this infant

carrier-rate of salmonella infections is just as important in the community as typhoid and dysentery carrier-rates in older persons. It certainly should receive close consideration in any plan of prevention."

The carrier rate, they report in the LANCET (Nov. 19), British Medical Journal is about 3.5%. In other words, between three and four of every 100 babies under two years in Brisbane is infected and a potential risk of epidemic spread.

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INVENTION

Xmas Tree Stand Clings To Floor by Suction

➤ WITH the Christmas season approaching, the government, at last, has issued an "in-season" patent. It is for a Christmas tree stand, a kind that clings to the floor by means of suction cups of rubber.

The main part of the stand is a metal plate which has a pocket on its lower side and projecting parts to drive into the stump of the tree on its upper face. Under it all, and fixed to the metal plate, is a sheet of flexible rubber fabric which is cupped into the pocket to form the "vacuum" to provide the suction to hold the tree from sliding around on the floor.

The device is designed also for use in securing a smoking stand or lamp stand to the floor or table. The inventor is Arthur D. Zedler, Yonkers, N. Y. The patent number is 2,489,845.

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X-RAY MICROSCOPE—Miss Charlys M. Lucht, of the General Electric Research Laboratory, demonstrates an experimental X-ray microscope. The microscope makes it possible to examine directly minute details of internal structure in materials through which light cannot pass.

PSYCHIATRY

Birthdays Remembered Under Hypnosis

► CAN you remember on which day of the week your birthday fell when you were four years old, or seven or 10?

Probably not, but if you were successfully hypnotized by a psychiatrist, you probably could.

More than 40 of a group of 50 persons, 10 women and 40 men, were, when hypnotized, able to recall correctly the days of the week for their birthdays and for Christmas when they were four, seven and 10 years old. Dr. Robert M. True, of the University of Vermont College of Medicine, reports in the scientific journal, *SCIENCE* (Dec. 2).

An extremely small percentage gave the correct answers to any of these questions before hypnotic induction, he reports. The percentage was so small that when correct answers were given it was probably by chance.

Dr. True's study was done to develop a simple, practical test to tell the psychiatrist whether a patient being psychoanalyzed under hypnosis has really gone back to his early childhood and is telling what happened then and reliving those experiences, or whether he is telling and acting out experiences in his current memory.

For the psychiatrist to have a method of distinguishing between a real childhood state under hypnosis and a half-pretended one is important, Dr. True points out, because recall of actual hurtful experiences is more beneficial in treating a neurosis than the reliving of an imagined experience.

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DENTISTRY

Brush That Sweet Tooth To Avoid Decay

► IF you have a sweet tooth, and want to satisfy it, use toothbrush and mouth rinse immediately afterwards to avoid tooth decay. Better use toothbrush and mouth wash after any meal.

This advice, bringing the fight on caries full circle back to the clean tooth idea, comes from studies by Drs. H. W. Haggard and Leon A. Greenberg of Yale University.

These scientists are physiologists, not dentists. They take the view that if sugar is a cause of tooth decay, regardless of the mechanism by which it affects teeth, the magnitude of its effect will be related to the concentration of sugar in the mouth and particularly to how long it stays there.

A caramel and orange juice, they found, both brought the sugar content of the saliva up to almost the same high point of 800 mg per 100 cc. But 20 minutes after the orange juice, there was almost no sugar left from it in the saliva, whereas 45 minutes after the caramel, there was still considerable sugar left from it.

Thoroughly brushing and washing teeth

and mouth after eating the caramel, however, immediately brought the sugar concentration in the saliva to the zero baseline.

Trying to avoid tooth decay by avoiding sugar, the Yale scientists point out, is impractical, because almost all starch food-stuffs produce sugar in the mouth, and micro-organisms involved in tooth decay make no distinction as to the source of the sugar.

A mixed meal, for example, brought the sugar concentration in the saliva to more than 600 mg per 100 cc, and it took 45 minutes before the sugar had dropped to the point reached 20 minutes after the orange juice.

Their tests, reported in the *DENTAL SURVEY*, were made at five, 10, 20, 30 and 45-minute intervals after eating each of the following: a mixed meal, fresh orange juice, grapefruit juice, ice cream, crackers, chewing gum, caramel candy and sweetened bottled soft drinks.

Science News Letter, December 10, 1949

ENGINEERING-AERONAUTICS

Fire-Resistant Hydraulic Fluid Is Approved

► THE need for a fireproof fluid for use in aircraft hydraulic mechanism to operate landing gear and other parts will be met, in part at least, by a new fire-resistant synthetic liquid that the Civil Aeronautics Administration has now approved for use in certain planes.

This new hydraulic fluid, known as Skydrol, is a joint development of Monsanto Chemical Company, St. Louis, and Douglas Aircraft Company of Santa Monica, Calif. Its approval is for use in DC-4 and DC-6 transport planes. Later approval is expected for other planes, Monsanto officials state.

The hydraulic system of a modern plane by means of which controls and flaps and other parts are operated from the pilot's cabin includes much tubing leading to various sections of the plane, as well as pumps and valves. The pressure in the tubes may be as high as 3,000 pounds per square inch. If a leak should develop in the system, the hydraulic fluid would escape into near and far-away places in the plane. If combustible, it would then be a fire hazard. It would be an extreme hazard in a plane crash.

A hydraulic fluid requires a unique combination of chemical and physical properties. It must be a suitable lubricant for the pumps. It must be non-corrosive to avoid attacking the various metals in the system. It must not undergo undue thickening at low temperature and thinning at high temperature. It has to be light in weight to avoid adding undue weight to the plane. In addition, it should be highly fire-resistant. Skydrol is claimed to meet all these specifications.

Science News Letter, December 10, 1949

IN SCIENCE

ENGINEERING

First Coal-Burning Gas Turbine To Be Tested

► AMERICA'S first coal-burning gas turbine locomotive will be ready for testing before the end of the year, it was revealed by Dr. John T. Rettaliata of the Illinois Institute of Technology. It is being built by the Allis-Chalmers Manufacturing Company.

An American gas turbine locomotive using oil for fuel has been in use since early summer. Several coal-burning gas turbines are under development. Coal is a highly desirable fuel for locomotives because it is plentiful and well distributed for railroad use. Present coal-burning steam locomotives are on the way out, being replaced by the more efficient diesel. But diesels use oil for fuel.

This Allis-Chalmers coal-burning gas turbine locomotive, like the oil-burner in use and like most of the diesel locomotives, uses the prime power to develop electricity for the driving power. As described by Dr. Rettaliata, in the new locomotive air from the atmosphere is compressed and passed through a combustion chamber where its temperature is raised to about 1,300 degrees Fahrenheit by the burning of pulverized coal. It enters the turbine in the form of a hot gas. By expansion of the gas through it, the turbine develops power both for the compressor and the electrical generator.

Science News Letter, December 10, 1949

POPULATION

Birth Rate Is Third High in 25 Years

► IF you think almost every young couple you know had a baby this year, you are not far off. During the first nine months of the year births of 2,669,000 babies were registered, the National Office of Vital Statistics estimates on the basis of figures now available.

This gives an estimated birth rate for the first nine months of 24.1 per 1,000 population, which would mean, in round numbers, one baby for every 20 couples if every 1,000 population were made up of 500 couples. Actually, the per 1,000 population figure includes some children and old people.

The birth rate this year is almost the same as for the corresponding period of 1948, which was 24.2, the second highest for the January-September period in over a quarter of a century.

Science News Letter, December 10, 1949

SCIENCE FIELDS

BIOCHEMISTRY

Radioactive Ground Moles Help Fight Against Polio

➤ RADIOACTIVE ground moles will help fight infantile paralysis and cows will, perhaps contentedly, swallow radio sulfur to show scientists more about milk protein synthesis.

These are among research programs utilizing radioactive materials from the Atomic Energy Commission's pile at Oak Ridge, Tenn. The physical research division of Eli Lilly Company at Indianapolis, Ind., hopes to tag the ground moles with radiocobalt to find out where they burrow, the distances they travel and other habits. If the moles can be tagged and more learned about them, they may become useful animals for infantile paralysis research since they will live in their natural state and not under laboratory conditions.

Radiosulfur-fed cows are expected to tell scientists at Lankenau Hospital Research Institute, Philadelphia, and the Borden Company Laboratory, Scarsdale, N. Y., to what extent sulfur-containing amino acids for protein in milk are formed in the rumen, or first stomach of the cow.

Science News Letter, December 10, 1949

MEDICINE

Oxygen Lack Reduces Radiation Cell Damage

➤ X-RAY damage to the hereditary cells of plants, similar to that which atomic radiation causes, can be greatly diminished by eliminating the surrounding oxygen, say two Oak Ridge scientists, Drs. Norman H. Giles, Jr., and Herbert Parkes Riley.

These findings, while not directly applicable to humans, have possibly important implications for medical research.

In an attempt to confirm recent reports of an oxygen-radiation damage relationship, the two biologists subjected the plant *Tradescantia* to X-ray bombardment while it was in different mediums, namely oxygen, nitrogen, and air. They found that changes in the chromosomes, seat of the genes which control heredity in plants, animals and humans, were greatest when the plant was in oxygen and least when it was in nitrogen.

To make sure that it was not the gases which were causing the "chromosomal rearrangements" they placed plants in each of the mediums without applying X-rays. They found that the gases alone did not produce the effect.

In all tests with X-rays they found that absence of oxygen lessened cell damage. Besides nitrogen, they tested the plants in helium and argon. Each time the damage

was less than when the plants were X-rayed while in oxygen.

Drs. Giles and Riley, reporting their findings in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Nov.), do not know whether the oxygen affects the actual chromosome breakage or the later recovery process.

Another government scientist who commented on their report, tentatively favors the theory that the absence of oxygen slows down the movement of the chromosomes. This, he believes, aids the repair of X-ray breaks, while the presence of oxygen permits and perhaps speeds up cell movement, thus preventing breakage repair.

He pointed out that if this is the case the discovery would not be of much immediate application in preventing human chromosome damage in the event of an atomic burst, because in the absence of oxygen a man would soon die.

He suggested, however, that other methods may be devised to slow down cell division, such as low temperature or chemicals. He stressed that this was still highly conjectural, but that such problems would probably be solved eventually by research in atomic medicine.

Science News Letter, December 10, 1949

MATHEMATICS-ENGINEERING

Giant Brains Are Explained in New Book

➤ ADD "cybernetics" to your modern vocabulary. It is a new coined word which applies to the science of control and communication in the animal and the machine. The term is used by the scientists who developed the giant electronic and mechanical computers that are now solving problems in seconds that would require many months with pencil and paper.

These machines are complicated affairs, well beyond the understanding of the ordinary human. A popular explanation, however, is now available. It is in a new book just published, *GIANT BRAINS, OR MACHINES THAT THINK* (John Wiley and Sons, Inc.). The author is Edmund C. Berkeley, an authority on the subject.

There are several of these computers now in use in the country, and more under development. They include Harvard's Mark I, II and III; the differential analyzer at the Massachusetts Institute of Technology; the Bell Telephone Relay Calculators; the so-called ENIAC developed at the University of Pennsylvania, and BINAC built by Eckert-Mauchly Corporation, Philadelphia. One of the newest is the BEMAC, built by Boeing Airplane Company, Seattle, Wash., and used to determine how a guided missile will behave on an imaginary flight in the air without even being shot into the air at all.

While the new book is entitled *GIANT BRAINS*, the computers are not brains at all. They do no thinking. With the use of hundreds of electronic tubes, electric relays and special mechanisms, they fol-

low instructions fed into them in electric code to find the answers of problems, also fed into them in code. They are unlike the punch-card machinery used by hundreds of businesses today. They use reels of magnetic tape coded in a language of their own. They are machines that handle "huge quantities of information automatically."

Science News Letter, December 10, 1949

AERONAUTICS

Nitrogen Tetroxide Is a Top Rocket Aid

➤ A LONG known but little used chemical, nitrogen tetroxide, promises to become a number one aid in rocket propulsion, the American Rocket Society was told by Douglas H. Ross of Allied Chemical and Dye Corporation, New York.

Nitrogen tetroxide is not a fuel. It is an oxidizer to provide the necessary oxygen for combustion. It is a chemical of high oxygen content. It is about 70% oxygen and it is capable of releasing the entire amount under such rigorous conditions as encountered in a rocket motor.

It is a chemical easily made from ammonia. It can be produced in abundant quantities. Some 500,000 tons annually could be made in the United States if only 10% of the present ammonia output were converted to nitrogen tetroxide.

Rockets, unlike all other types of jet-propulsion, can operate miles above the earth where there is not enough oxygen in the air to support combustion. It carries its own oxygen, either mixed with the fuel or in separate containers to mix in the combustion chamber. Finding an efficient oxidizer is as important as finding an efficient fuel.

Nitrogen tetroxide, Mr. Ross stated, has high chemical stability, high density, low freezing point, and little susceptibility to decomposition.

Science News Letter, December 10, 1949

MEDICINE

Warning Issued Against Anti-Histaminics Use

➤ A WARNING against "indiscriminate use" of the anti-histaminic substances now available at drug stores in anti-cold pills has been issued by the American Medical Association.

The A.M.A. is not convinced that there is enough evidence yet to warrant the claims being made on anti-histaminics for colds. Also, A.M.A. records show that about one-third of those taking these drugs become drowsy or fall asleep at work.

Possibility of harm when the drugs are taken over long periods and of people taking too much in case of persistent colds are other points made.

Science News Letter, December 10, 1949

METALLURGY

Trick Metals to Improve Steel

The monocrystalline structure of certain metals used in research gives them unique properties. Yet due to atomic flaws these single crystal metals are very weak.

By J. G. FEINBERG

See Front Cover

➤ SILVER rods which bend like lead, but cannot be unbent. Metal wires which can be pulled out as easily as a piece of taffy—once, but not a second time.

Those are the sort of trick metals to be found in the laboratory of Prof. E. N. daC. Andrade, world authority on metallurgy, at London's University College, who will soon become director of the Royal Institution.

The rods that bend and wires that stretch are single crystals several inches in length. By contrast, the ordinary piece of metal is made up of a myriad of microscopic crystals. They are polycrystalline. The monocrystalline structure of Prof. Andrade's metals gives them their unique properties.

Of what practical value is this work with forms of metals which exist only in specialized laboratories? The ultimate practical gains may be great, says Prof. Andrade. It is well known that even the toughest steel our steel-makers can turn out of their furnaces today is only 1/40th as strong as it theoretically could be. There are theoretical possibilities of vastly increased strength of materials.

"Where so many of the dreams of inventors are clearly impossible on simple grounds of energy and such-like fundamental considerations, gigantic advances are here, at any rate, not inherently ruled out," Prof. Andrade declares.

Unusual Characteristics

These single crystals of metals possess unusual and unexpected characteristics. On the basis of theoretical calculations, it was expected that single crystal metals would be much stronger and tougher than the ordinary polycrystalline forms. Prof. Andrade was amazed, therefore, to find that they were softer and much less resistant to stress.

A one-half inch single crystal wire can be stretched by pulls of, depending on the metal, between two and 20 pounds. A child could stretch the softer of the metals.

But, once the wire is pulled, or the rod bent, the metal undergoes a strange toughening. A single crystal copper wire can easily be pulled to twice its original length, but having reached this maximum length, it then takes 80 times as much force to stretch it any farther. X-ray analysis indicates that the reason for this is that

stretching destroys the single crystal structure of the metal. The length to which one of these trick metals can be drawn is shown on cover, contrasted with an undrawn single crystal.

Another unusual characteristic of single crystal metals is that, regardless of the direction of the pull, they insist on stretching in directions of their own choice. Nor does the wire stretch uniformly. Rather it elongates in spurts along certain very definite planes. In scientific language, mono-crystalline wires are said to have definite glide-directions and glide-planes.

The result of these innate predilections is, on stretching, a peculiar flattening of the wire, accompanied by curious steplike ridges, as if the crystal had slipped in layers. These steps are called slip-bands and can clearly be seen with the naked eye. The distance between the bands varies with the different metals and with the temperature. Sometimes a single crystal will exhibit several slip planes at angles to each other and frequently twinning occurs, with two sets of bands which are mirror images of each other.

Twinning Occurs

Twinning is a phenomenon which is not yet clearly understood, but for the other

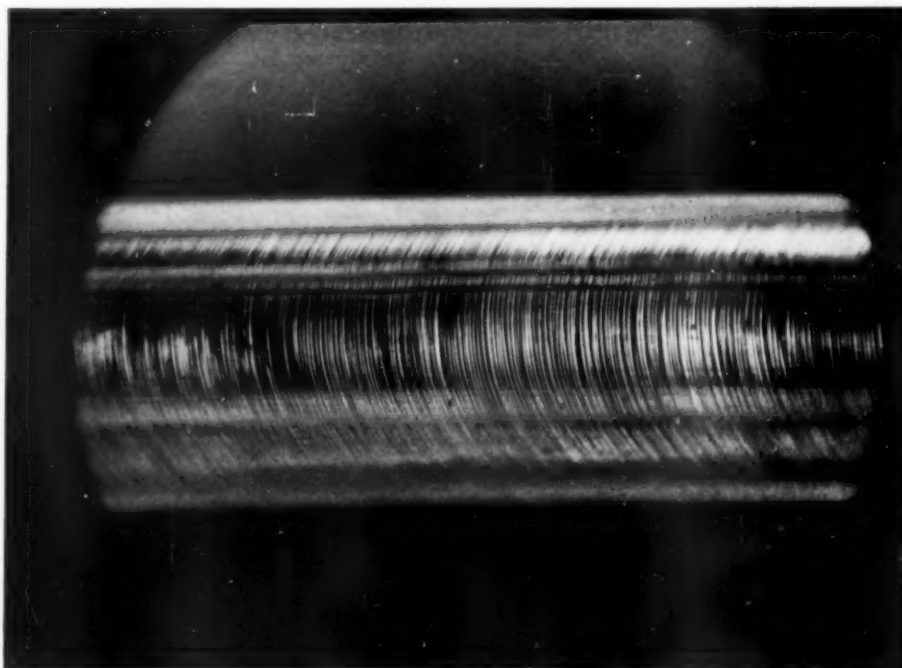
peculiarities of single crystal metals Prof. Andrade has reasonable explanations based on his own experimental work and deduced by analogy from the behavior of other substances.

The softness and gliding properties of his single crystal wires Prof. Andrade explains on the basis of imperfections in the surface layers of atoms, to ultra-microscopic "cracks" in the atomic "skin" of the crystal. Thus, a coating of oxide only 20 atoms thick will increase by 50% the force required to stretch a 0.5 millimeter wire, while thicker films will double the stress required. Also, bombarding a wire with alpha particles (hearts of helium atoms) while it is stretching very much increases the rate of flow of single crystal cadmium in the early stages, when fresh glide planes are being formed. Since the alpha particles have practically no penetrating power, this can only be a surface effect.

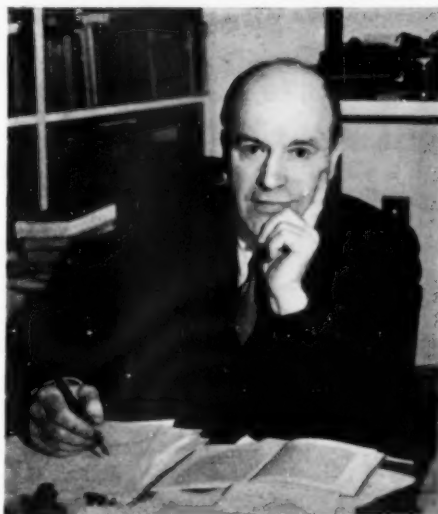
Surface Has Defects

It is possible that internal flaws may play a part, admits Prof. Andrade, but he feels that "surface defects are the only ones whose effect has so far been definitely proved in the case of metals."

Analogous deductions can be made from the experimental weakness of non-metals like glass, quartz and rock salt as compared with their theoretical strengths. In each of these cases it has been shown that the weakness lies in minute cracks in their surfaces, cracks which can be made visible



STRETCHED SINGLE CRYSTAL—The slip bands in a solid mercury single crystal which has been stretched are pictured.



METALLURGY AUTHORITY—
Prof. E. N. daC. Andrade prepares
papers which tell of his research with
single crystal metals.

by exposing them to sodium vapor. In the case of sheet mica, the surface of which is remarkably free of flaws except at the very edges, it has been shown that the strength of such sheets is ten times greater when the stress is kept solely on the perfect surface than when it extends to the imperfect edges.

Making Crystals

To make his single crystals, Prof. Andrade encloses an ordinary wire of many crystals in a glass tube in which it fits loosely and from which all the air has been evacuated. He then runs a traveling furnace slowly, at about the rate of half an inch an hour, over the tube. The wire melts locally and then re-solidifies as the furnace moves along, resulting in a single crystal. In the case of metals with melting points higher than that of glass, Prof. Andrade employs molds made of carbon.

The first specimens ever seen of the single crystal forms of some metals were prepared by Prof. Andrade as long ago as 1913. Since then he has devoted his energies to their study. So interesting and novel were the properties of single crystal metals that between the wars they were studied extensively by scientists in England, Russia and Germany, but for some reason the subject has not attracted American investigators.

Atomic Flaws Weaken Crystals

One lesson learned from the study of the single crystals is that, because of atomic flaws, the individual metal crystals are exceedingly weak. The greater strength of every day metals lies in their haphazard polycrystalline structure, with the glide-planes and glide-directions of the crystals oriented at random. Thus each crystal is hemmed in by other crystals which will not readily give in the same direction or

plane in which it gives most easily. This is much like the principle of the girder, in which the planes of several sheets of metal are fixed at right angles to each other.

Prof. Andrade believes his experimental results point two tasks for the practical metallurgist:

1. To see if the atomic flaws in metal surfaces can be eliminated.
2. If not, to see how the polycrystalline nature of metals can be increased.

Science News Letter, December 10, 1949

ENGINEERING

Electric Discharge Prints Instrument Chart Paper

► CHART paper for use particularly with commercial facsimile telegraphy, but usable in many types of recording instruments, has a coating of electrosensitive material which is "printed" by an electric current passing to it from a simple wire stylus.

The new paper, dubbed Teledeltos, was developed by the Western Union Telegraph Company and was revealed at the annual meeting of the Society for Experimental Stress Analysis by Grosvenor Hotchkiss of the company. It meets the requirement in facsimile recording by being instantaneous, dry and permanent. The coated paper is light grey in color. The current flowing through it produces a black mark.

In previous facsimile transmission, the record was made photographically by a beam of light on photo-sensitive paper. Facsimile is a system, now coming into wider usage, in which an entire printed page, letter, message or photograph is sent by radio waves or through wire connections from a transmitter to distant receivers. In the transmitter, the copy is rapidly scanned by a beam of light that passes over it in successive lines, each close to the one above. The reflected light, varying with the variations in the markings on the surface being scanned, operates a photo-electric cell from which varying electrical energy is emitted.

At the receiving end, the process is in reverse. The electrical energy causes variation in the beam of light from a photo-electric cell. The varying intensity of the

light reproduces an exact copy of the original on sensitized paper. With this new paper, the record made requires no finishing or fixing. The paper is usable for automatic train position recorders, recording chronographs and galvanometers, wave pattern recorders and other instruments.

Science News Letter, December 10, 1949

NUTRITION

Dairy Products Improved By Ion-Exchange Milk

► SMOOTHER ice cream, improved quality of baked goods and improvements of various other dairy products by the use of ion-exchange milk are foreseen by Dr. C. W. Gehrke of the University of Missouri at Columbia, Mo., and Dr. E. F. Almy, of Ohio State University at Columbus.

Ion-exchange milk is milk that has been modified by the use of certain artificial resinous materials. Reporting on their joint researches at Ohio State University in the scientific journal, SCIENCE (Nov. 25), Drs. Gehrke and Almy state that these materials seem to "offer a variety of possibilities for modifying the mineral components of milk," either by removing ions, such as calcium, or substituting other ions for those normally present or by both operations.

Science News Letter, December 10, 1949

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MEDICINE

Sponge Aids Cancer Fight

► A NEW aid in the fight against cancer has been developed by Dr. Sidney A. Gladstone of New York Polyclinic Hospital and Medical School.

It consists in a method for getting material for cancer detection in the early stages of the disease before it shows signs or symptoms that either patient or doctor notice.

All the doctor does is to rub a tiny piece of a gelatine sponge over the surface of the area that might be cancerous. The sponge absorbs fluids, cells and tissue particles. The sponge and its absorbed contents are then fixed in formalin, embedded in paraffin and cut by a microtome into very thin slices. The slices are then stained and on examination by a trained pathologist reveal the presence of cancer, if the patient has cancer.

The fixing, staining and other treatment of the sponge are essentially the same as in the procedure for cancer diagnosis, called biopsy, in which a tiny piece of suspected cancer is cut out for microscopic examination.

The sponge method is not only simpler but has the great advantage of picking up

cancer cells from surfaces that look so normal the doctor does not suspect the need for punching or cutting out a bit of tissue for examination.

In one case, for example, a 48-year-old woman's "vague complaints" were thought due to the glandular changes of middle age. The sponge biopsy of the womb was made in the course of examination, although no abnormalities were seen. The sponge biopsy revealed the presence of cancer, which was confirmed at operation, although a surgical biopsy missed the cancer.

Cancer of the skin, vocal cords, bronchi, esophagus, rectum and stomach can also be diagnosed in early stages by this method, Dr. Gladstone pointed out in a report to the *NEW ENGLAND JOURNAL OF MEDICINE* (July 14).

Because the sponge must be able to withstand the dissolving action of alcohol, chloroform, acetone or other fluids used in preparing the material for microscopic examination, Dr. Gladstone has worked chiefly with a sponge called gelfoam, manufactured by the Upjohn Company.

Science News Letter, December 10, 1949

PSYCHIATRY-DENTISTRY

Caries-Neurosis Link

► TOOTH DECAY and a neurotic personality seem to go together.

Doctors and dentists have for some time assumed that mental and emotional factors might affect the teeth, just as these factors play a part in stomach ulcers, colitis, asthma and other bodily disorders.

Now statistical evidence for the relation between personality and tooth health has been obtained.

A Bernreuter personality inventory, said to be the "best and most valid test of its kind to measure traits of personality as divorced from intelligence," was given to 50 men and women faculty members, students and employees of Tufts College Dental School.

The same 50 also were scored as to the number of decayed, missing and filled teeth.

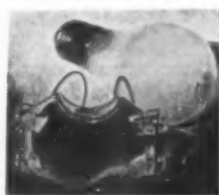
When the two scores were compared, they showed that all but four of those with the least neurotic tendencies had a D.M.F. tooth score of less than 40, while all but five of those above the lowest levels of neurotic tendencies on the personality score had a D.M.F. tooth score above 40.

The data have statistical significance with less than one percent possibility that the results are due to chance, Dr. John H. Manhold and Vivian W. Manhold who made the studies at Tufts report in the scientific journal, *SCIENCE* (Dec. 2).

Science News Letter, December 10, 1949

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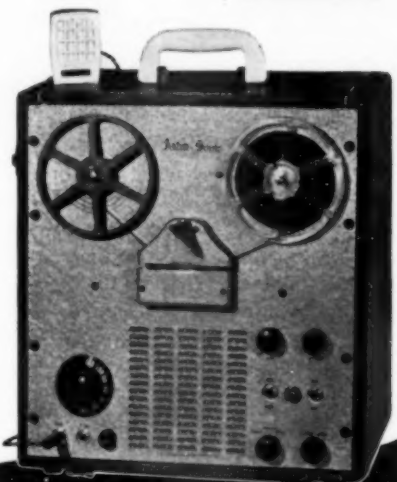
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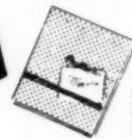
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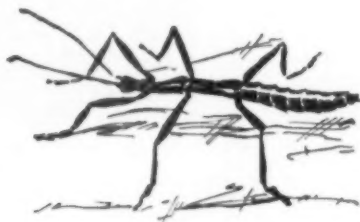
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Walking Stick

➤ THIS strange insect is designed with such a close resemblance to a twig that as long as it remains immobile, it stands an excellent chance of escaping detection. But if you keep your eyes peeled in the country, if you suddenly see a stick walking, it's probably a walking stick.

Now that the frost has come you are likelier to see some of the queerer creatures of the insect kingdom, sluggishly dragging

themselves about in the relative warmth of noon. This time just before the deep snows is a good time for observing walking sticks.

The common walking stick of the United States is related to many similar insects, many of which abound in the tropics. One characteristic that this family of insects shares is the remarkable imitation which each species has managed to achieve of the twigs of its local environment. Some of the tropic varieties especially so cleverly mimic the appearance of their surrounding leafy vegetation that trained observers are frequently fooled.

It is remarkable that an insect which blends so perfectly with its environment as to seem to be immune from all predators, does not become so abundant as to be a pest. This may be because there is only one generation per year, and the number of eggs laid by each female is about one hundred. Compared to most other insects, notoriously fertile and prolific, this is very restrained rate of reproduction.

Like the grasshoppers to which they are closely related, walking sticks are vegetarians. Their color changes with the season, being green during the summer, turning to gray and brown later in the year. This change in color is actually part of the maturing process of the insect. The young hatch out about May. At this stage

they are a pale green. They molt twice without change of color. As they develop into mature insects their color changes to the darker hue, more suitable to the color of fall vegetation.

The walking stick's manner of laying eggs is in keeping with its camouflaged appearance. Instead of fastening them to a leaf or depositing a heap of them in some natural recess somewhere, the female drops her eggs on the ground. These eggs, like the parents, are cleverly imitative also. They look like seeds of some plant, and they are scattered about loosely on the surface of the ground.

Where an egg falls, next spring there will probably hatch out a young walking stick. The egg is the winter hiding place for the developing, hibernating insect. By spring the brand new walking stick is ready to emerge. The warm spring sun signals to it. It pushes on the top of the shell. And lo, it lifts up like the top of a hinged box. And another walking stick steps forth, to live out its harmless summer, and to leave deceptive seedlike eggs on the ground, its bid for immortality.

Science News Letter, December 10, 1949

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AIRCRAFT MAINTENANCE AND SERVICE—R. H. Drake—*Macmillan*, 352 p., illus., \$6.00. Step-by-step procedure for airplane mechanics, students and laymen. All the information necessary to qualify for mechanics certificate.

ALCOHOL AND HUMAN AFFAIRS—Willard B. Spalding and John R. Montague—*World Book*, 248 p., illus., \$1.64. Discusses the chemical history and effect of alcohol, compares religious attitudes toward it, and suggests what can be done to help alcoholics.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING—Clark Kerr and George Halverson—*National Planning Association*, Case study No. 6, 87 p., illus., \$1.00. A case study of the no-strike relationship between Lockheed Aircraft Corporation of Burbank, California, and Lodge 727 of the International Association of Machinists.

COCIDIOSIS—Sterling Brackett and others—*New York Academy of Sciences*, 623 p., illus., paper, \$3.00. A monograph including reports from investigators in the field which will help to point the direction for future studies.

COMMUNITY HEALTH—L. B. Chenoweth and W. R. Morrison—*Appleton*, 3rd ed., 314 p., illus., \$3.00. An elementary hygiene text completely revised. Former editions were published under the title of *Community Hygiene*.

ENERGY AND MATTER—R. L. Worrall—*Staples Press*, 144 p., \$2.00. Energy and matter examined in their historical setting. In non-technical language.

FLUID PRESSURE MECHANISMS—H. G. Conway—*Pitman*, 218 p., illus., \$5.00. The author deals with hydraulic, pneumatic, and compressed gas systems of high, medium, and sometimes low pressure.

GLOSS: ITS DEFINITION AND MEASUREMENT—V. G. W. Harrison—*Chemical Publishing Company*, 145 p., illus., \$4.00. A critical study of the literature.

GOETHE AS A SCIENTIST—Rudolf Magnus—*Schuman*, 259 p., \$3.50. A biography of the great poet based upon his scientific interests and achievements.

HALF-HOURS WITH GREAT SCIENTISTS: The Story of Physics—Charles G. Fraser—*Rein-*

hold, 527 p., illus., \$6.00. Short biographies of the men who gave valuable contributions to the field of physics. Valuable illustrations.

HEREDITY EAST AND WEST: Lysenko and World Science—Julian Huxley—*Schuman*, 246 p., \$3.00. The author explores the scientific, social, and political aspects of the Mendelism versus Lysenkoism controversy. Another volume in the Life of Science Library.

I DID NOT INTERVIEW THE DEAD—David P. Boder—*University of Illinois Press*, 220 p., \$3.50. Verbatim transcriptions of the narratives of eight displaced persons interviewed by a psychologist.

INDUSTRIAL MICROBIOLOGY—Samuel Cate Prescott and Cecil Gordon Dunn—*McGraw-Hill*, 2nd ed., 923 p., illus., \$8.50. Thoroughly revised with special emphasis on methods of cultivating the organisms, on production media and methods, and on literature references.

INTRODUCTORY BOTANY—Alexander Nelson—*Chronica Botanica*, 479 p., illus., \$3.75. An introductory text. Morphology and anatomy are stressed by the Scottish author.

AN INTRODUCTION TO MOLECULAR SPECTRA—R. C. Johnson—*Pitman*, 296 p., illus., \$7.50. A textbook for the graduate or approaching graduate in chemistry or physics.

MEAT AND MEAT FOODS: Processing and Preservation from Meat Plant to Consumer—Lloyd B. Jensen—*Ronald*, 218 p., illus., \$3.75. Introductory text on meat technology or microbiology of meats. Written in non-technical language.

OUTLINES OF FOOD TECHNOLOGY—Harry W. von Loesbeck—*Reinhold*, 2nd ed., 585 p., illus., \$7.50. A college textbook.

RADIO-FREQUENCY HEATING EQUIPMENT—L. L. Langton—*Pitman*, 196 p., illus., \$3.75. Discusses the design of equipment and also presents some applications of the technique. The reader is expected to have some previous knowledge of electrical or radio engineering.

A SHORT HISTORY OF CHINESE ART—Hugo Munsterberg—*Philosophical Lib.*, 227 p., illus., \$5.00. Traces the history of Chinese art from prehistoric times to the Manchu

Dynasty against the panorama of Chinese history and culture. It is designed for the interested layman as well as the college student.

THE STATE OF FOOD AND AGRICULTURE: A SURVEY OF WORLD CONDITIONS AND PROSPECTS—Food and Agriculture Organization—*United Nations*, 138 p., paper, \$1.50. Economic and nutritional levels are compared. Includes prospects for 1950-1951.

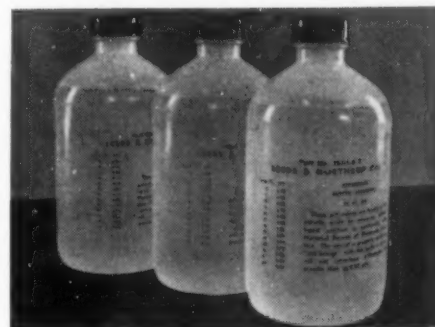
TRANSACTIONS OF THE WISCONSIN ACADEMY OF SCIENCES: ARTS, AND LETTERS Vol. 39—Banner Bill Morgan and others—*Wisconsin Academy of Sciences*, 247 p., paper, \$4.00. Compilation of articles covering aspects of the biological, physical, and social science fields by specialists. This volume includes the years 1947, 1948, and 1949.

VEGETABLE GUMS AND RESINS—F. N. Howes—*Chronica Botanica*, 188 p., illus., \$5.00. A book on gums and resins from the plant science point of view, including natural laquers, medicinal resins and little known gums.

VITAMIN E—Karl E. Mason, Director—*New York Academy of Sciences*, 427 p., illus., paper, \$4.50. A monograph compiling much information on this vitamin and its varied aspects.

YOUR NASAL SINUSES AND THEIR DISORDERS—Albert P. Seltzer—*Froben*, 155 p., illus., \$2.50. Intended to provide reliable information for those who insist on self-diagnosis and to suggest measures to prevent actual cases of sinus infection.

Science News Letter, December 10, 1949



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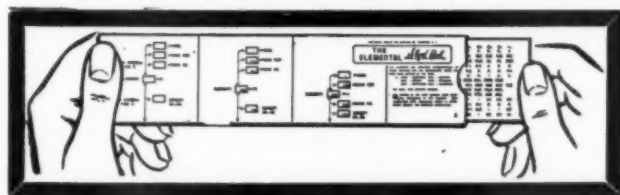
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Science News Letter, December 10, 1949

❁ **RUBBER SPRINGS**, to take the jerks and bumps out of riding a tractor, operate on a torsional shear principle and are used in pairs horizontally placed under the seat. They consist of a thick layer of special rubber sandwiched between and fastened to two metal plates.

Science News Letter, December 10, 1949

❁ **FLATIRON HOLDER**, for a hot electric iron, has a metal base, which is fastened to but spaced away from a wall, on which are side flanges with space between them for an inserted iron point-end down.

Science News Letter, December 10, 1949

❁ **RAIN GAGE**, shown in the picture, is a simple but accurate type, made of transparent shatter-proof plastic, designed particularly for farmers, gardeners, home owners and amateur meteorologists. The



graduated tube, easily read, can be removed from the metal holding frame for emptying.

Science News Letter, December 10, 1949

❁ **CARBURETOR PREHEATER** is claimed to be able to overcome sluggish starting of the automobile engine in cold

weather. Designed for easy installation between carburetor and intake manifold, the unit consists of an electrical heating element held by two terminals in a plastic gasket.

Science News Letter, December 10, 1949

❁ **WIRE CUTTER FOR DENTISTS**, for use in straightening teeth and the wiring of broken jaws, is made of stainless steel with edges of hard carbide metal. The cemented carbide cutting edges, being far harder than any other metal, keep in sharp condition and make wire cutting easy.

Science News Letter, December 10, 1949

❁ **PLASTIC PIPING**, one-twelfth the weight of steel tubing, is being used to draw off salt water from crude oil deposits. It is made of a cellulose acetate butyrate plastic and, in addition to being light in weight, is non-corrosive, flexible and strong.

Science News Letter, December 10, 1949

❁ **STEREOSCOPE**, a small-sized plastic type for youngsters in the fairy-story stage, comes with ten stories in color, each composed of ten slides containing double pictures to give the three-dimensional effect. Familiar stories, such as "Jack and the Beanstalk," are included.

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